Electronic Supplementary Information

A peptide with a cysteine terminus: Probe for label-free fluorescent detection of thrombin activity

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S1. Synthesis of dC_{12}-AgNCs

The synthesis of DNA-AgNCs was based on a previously reported method.[S1,S2] AgNCs were synthesized by mixing $AgNO_3$ with a DNA (dC_{12}) solution and by adding $NaBH_4$ with continuous shaking. In brief, 150 µl of the DNA (dC_{12}) template (200 µM) was mixed with 2724 µl of phosphate buffer (2.0 mM, pH 7.4). Freshly prepared $AgNO_3$ aqueous solution (90 µl; 2.0 mM) was added to this solution. The resulting solution was vigorously shaken for 30 s. After 15 min in an ice bath, 36 µl of freshly prepared $NaBH_4$ aqueous solution (5.0 mM) was added to the solution. The mixture was vigorously shaken for 1min. The solutions were kept in the dark at room temperature for 2 h and then incubated overnight at 4°C.

S2.Sequence-dependent responses of dC_{12}-AgNCs to peptides

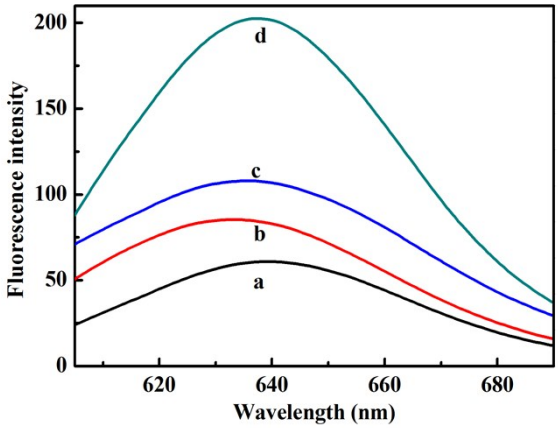

Fig. S1. Fluorescence responses of dC_{12}-AgNCs on different peptides (0.2 µM). (a) dC_{12}-AgNCs. (b) dC_{12}-AgNCs + peptide 1. (c) dC_{12}-AgNCs + peptide 2. (d) dC_{12}-AgNCs + peptide 3.

S3. Optimizing the amount of GO.

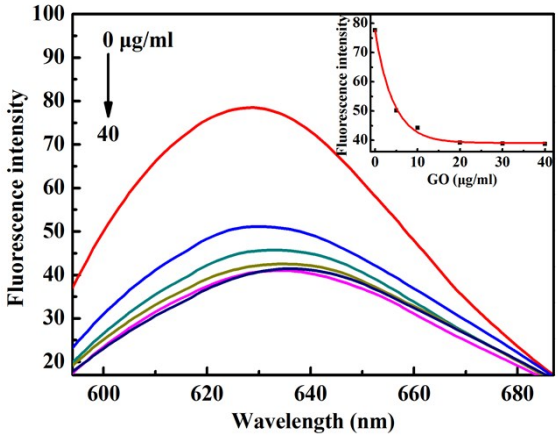

Fig. S2. Fluorescence responses of the dC_{12}-AgNCs-peptide 1 conjugate to different GO concentrations. 0.0, 10.0, 20.0, 30.0, and 40.0 µg/mL. Inset: Changes in

fluorescence intensity at 635 nm as a function of GO concentration.

S4.Zeta potentials of GO

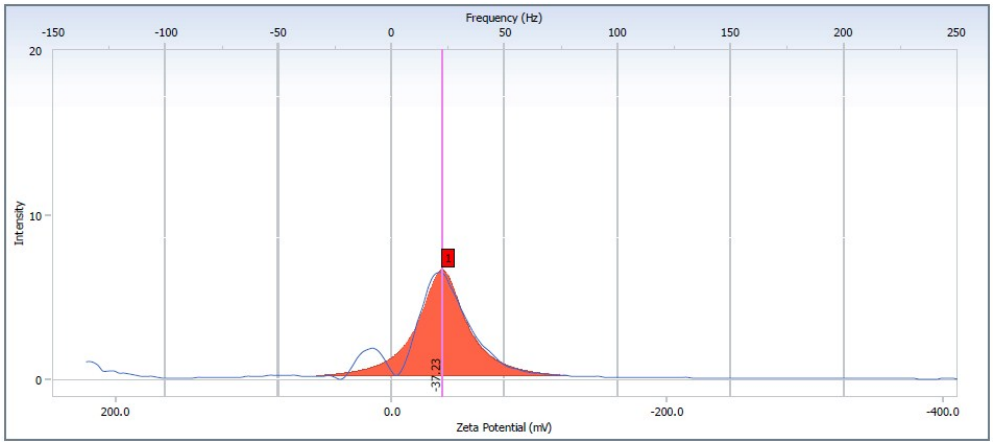

Fig. S3. Zeta potentials of 0.25 mg/mL GO in PBS (2.0 mM, pH= 7.4).

S5.Fluorescence responses of dC_{12}-AgNCs to peptides

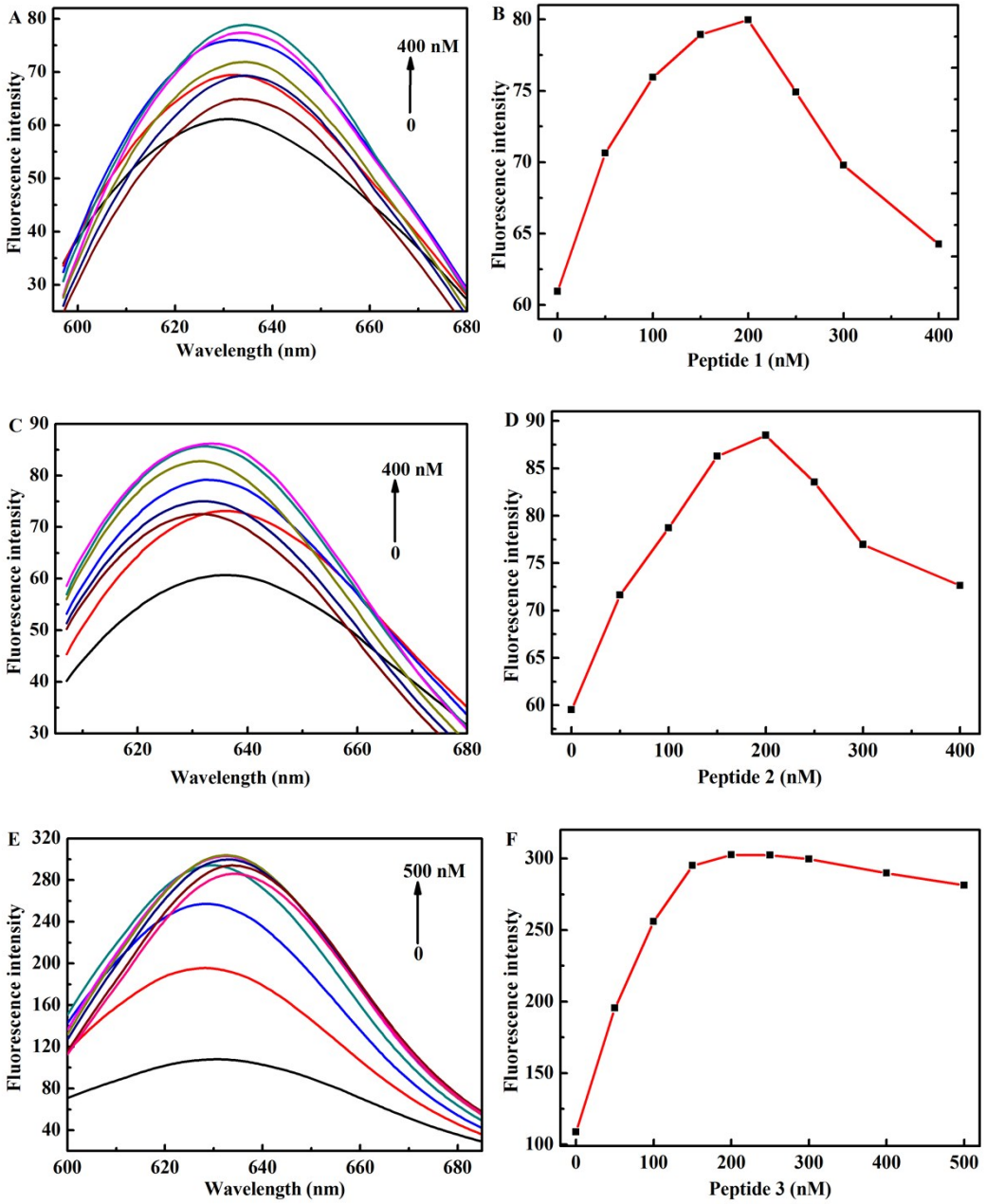

Fig. S4. Fluorescence responses of the dC_{12}-AgNCs to peptides. Peptide 1 (A), peptide 2 (C) and peptide 3 (E). Changes in fluorescence intensity at 635 nm versus the concentrations of peptides. Peptide 1 (B), peptide 2 (D) and peptide 3 (F).

S6. Fluorescence spectra of the ensemble of dC_{12}-AgNCs-peptide 2/GO incubated with thrombin

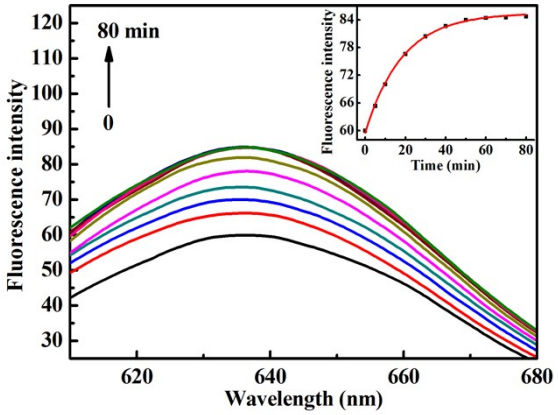

Fig. S5. Fluorescence spectra of the ensemble of dC_{12}-AgNCs-peptide 2/GO incubated with thrombin (0.1 μM) at 37°C in different periods. Inset: Changes in fluorescence intensity at 635 nm as a function of incubation time.

S7. Fluorescence response of dC_{12}-AgNCs to 0.2 μM peptides 1.

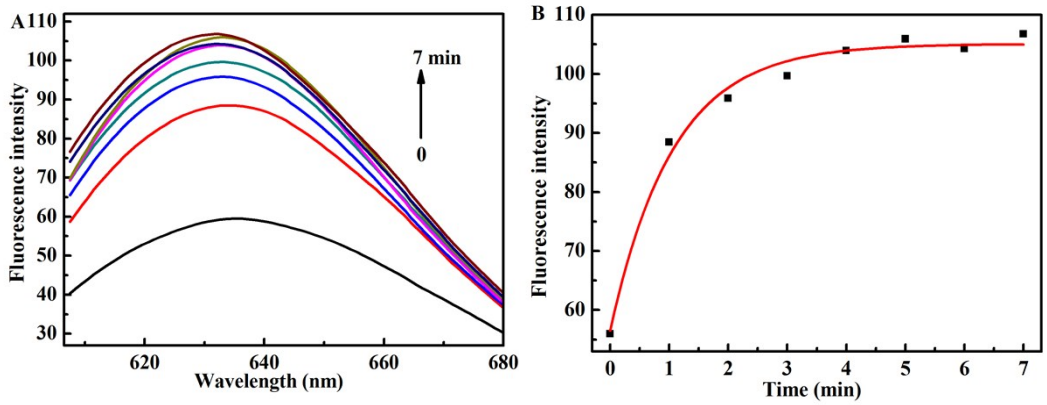

Fig. S6. (A)Fluorescence spectra of the dC_{12}-AgNCs reacted with peptide1 (0.2 μM) at room temperature in different periods. (B) Changes in fluorescence intensity as a function of reacted time.

S8. Analytical performance of different platforms for the detection of thrombin.

Table S1 Analytical performance of different platforms for thrombin detection

Method/Systerm	Detection Limit (nM)	Detection time-interval/h	Ref.
Colorimetric, G-quadruplex DNAzyme	20	5	S3
Colorimetric, fibrinogen-gold nanoparticle	3.2×10^{-6}	8	S4
Fluorescence, Exo III-assisted analyte recycling	0.09	1-1.5	S5
Fluorescence, Aptamer-Functionalized Silver nanocluster DNA Probes	1	0.5	S6
Fluorescence, polymerization/nicking DNA machine	62.5	2	S7
Fluorescence, G-quadruplex-based DNAzyme	0.001	3	S8
ISFET, Nucleic acid modified GO matrices	25	1-2	S9
Absorbance, Aptamer-functionalized Au nanoparticles	2	3	S10
FRET, Upconverting Phosphors/Carbon Nanoparticles	0.18	1.25	S11
Bioluminescence, Sandwich-type immunoassay	10	1	S12
Electrochemiluminescence, Magnetic Fe_3O_4@CdSe Composite Quantum Dot	1.2×10^{-2}	2	S13
Electrochemistry, Intercalation of MB in beacon aptamer	11	0.5	S14
Electrochemical impedance spectroscopy, Disposable screen- printed electrodes modified with functionalized graphene	10-50	1	S15
Fluorescence, GO/Aptamer/nucleic acid stabilized AgNCs	0.5	0.5-1	S16
Fluorescence, GO/peptide/nucleic acid stabilized AgNCs	1	1	Present study

S9. Reference SI

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